

# Testing for Specific Learning Disability in Written Expression and Dysgraphia

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# Specific Learning Disability (SLD) Defined

An Individual has a learning disability when they have average to above average ability but are struggling in one or more academic areas.

A learning disability typically involves a weakness in one or major cognitive processes (i.e. verbal reasoning, processing speed, working memory, etc.) and a weakness in an academic area such as basic reading, reading comprehension, reading fluency, math calculations, math problem solving, or written expression.

Learning disabilities can include disabilities such as dyslexia, dysgraphia, dyscalculia, and ADHD.



# Specific Learning Disability Areas under the IDEA

- Basic Reading
- Reading Fluency
- Reading Comprehension
- Math Calculations
- Math Problem Solving
- **Written Expression**
- Oral Expression
- Listening Comprehension



# Specific Learning Disability in Written Expression

- Underachievement (below grade-level expectations and below the average range compared to peers of the same age) in written expression skills despite adequate intelligence and appropriate instruction.
- Difficulty expressing thoughts and ideas clearly in writing in an organized manner with logical flow.
- Some may have difficulty with the physical aspects of handwriting, forming letters, using adequate spacing, writing on the line and within margins.



## Dysgraphia Defined

Dysgraphia is a written language disorder in serial production of strokes to form a handwritten letter. This involves not only motor skills but also language skills—finding, retrieving and producing letters, which is a subword-level language skill. The impaired handwriting may interfere with spelling and/or composing, but individuals with only dysgraphia do not have difficulty with reading.

A review of recent evidence indicates that dysgraphia is best defined as a neurodevelopmental disorder manifested by illegible and/or inefficient handwriting due to difficulty with letter formation. This difficulty is the result of deficits in graphomotor function (hand movements used for writing) and/or storing and retrieving orthographic codes (letter forms) (Berninger, 2015). Secondary consequences may include problems with spelling and written expression.



# Characteristics of Dysgraphia

- Variably shaped and poorly formed letters
- Excessive erasures and cross-outs
- Poor spacing between letters and words
- Letter and number reversals beyond early stages of writing
- Awkward, inconsistent pencil grip
- Heavy pressure and hand fatigue
- Slow writing and copying with legible or illegible handwriting

Additional consequences of dysgraphia may also include:

- Difficulty with unedited written spelling
- Low volume of written output as well as problems with other aspects of written expression



# Evaluating SLD in Written Expression and Dysgraphia

Identifying a learning disability starts with a full, comprehensive evaluation by certified individuals, which includes standardized testing of all of the student's processing abilities (intellectual processing skills) and academic achievement abilities. It is important to first rule out any vision difficulties. Formal evaluation includes both formal and informal data. All data will be used to determine whether the student demonstrates a pattern of evidence for dysgraphia or meets criteria for SLD in Written Expression. Information collected from the parents/guardians also provides valuable insight into the student's early years of written language development.

Test instruments chosen for the evaluation must be valid and reliable, standardized, norm-referenced, not racially or culturally discriminatory, include multiple measures of a student's writing abilities, be administered by trained personnel and in conformance with the instructions provided by the producer of the test instrument, and be provided and administered in the student's native language or other mode of communication.

Professionals conducting evaluations for the identification of dysgraphia will need to look beyond scores on standardized assessments alone and examine the student's classroom writing performance, educational history, and early language experiences to assist with determining handwriting, spelling, and written expression abilities and difficulties.

Informal data collection is also important (report cards, teacher input, parent input, school testing, benchmark testing, writing samples). The academic history of each student will provide the school with the cumulative data needed to ensure that underachievement in a student suspected of having dysgraphia is not due to lack of appropriate instruction in handwriting, spelling, and written expression.



# Evaluating SLD in Written Expression and Dysgraphia

## Domains to assess:

- Letter formation
- Handwriting
- Word/sentence dictation (timed and untimed)
- Copying of text
- Written Expression
- Spelling
- Writing Fluency (both accuracy and fluency)
- Cognitive Processes





# Diving Deeper into Areas of Evaluation

**Short-Term and Working Memory - Short-term memory** is the ability to hold information in one's mind and then use it within a few seconds. A component of short-term memory is working memory. **Working memory** relates to an individual's ability to attend to verbally- or visually-presented information, to process information in memory, and then to formulate a response.

## How are short-term and working memory connected to dysgraphia?

- Spelling and Phonological Processing: Short-term memory is crucial for phonological processing, which involves holding and manipulating sounds in mind. Individuals with dysgraphia may struggle with phonological awareness and encoding phonemes accurately due to short-term memory limitations. This can result in difficulties with spelling, phonetic awareness, and accurately representing sounds in written form.

## How are short-term and working memory connected to written expression?

- Sentence Construction and Syntax: Working memory is essential for holding grammatical rules, sentence structures, and word order in mind while constructing sentences. Individuals with weak short-term/working memory may struggle to effectively utilize their working memory resources, leading to errors in sentence formation, incorrect word order, or challenges in maintaining grammatical consistency throughout their writing.
- Vocabulary and Word Choice: Working memory plays a role in retrieving and selecting appropriate vocabulary and word choices during the writing process. Individuals with weak short-term/working memory may experience difficulties in holding a range of words in mind, making it challenging to access and incorporate diverse and precise vocabulary in their written expression. This can result in limited word choices and affect the richness and variety of their writing.
- Planning and Organization: Working memory is involved in planning and organizing written work. It allows individuals to hold multiple ideas, individuals with weak short-term/working memory may have challenges in efficiently using working memory resources to plan and organize their thoughts, leading to difficulties in creating coherent and well-structured written pieces.



# Orthographic Processing

Orthographic processing refers to the cognitive ability to recognize and manipulate the letters and spelling patterns in written language. It involves the skills related to understanding the visual representation of words, including letter recognition, letter-sound correspondence, and the rules governing spelling and word formation. Orthographic processing is closely connected to written expression in several ways:

- **Spelling:** Orthographic processing plays a crucial role in spelling. It helps individuals recognize the correct sequence of letters and apply the appropriate spelling patterns for different words.
- **Word Choice:** Effective written expression relies on choosing the right words to convey meaning and intent. Orthographic processing skills enable individuals to access and retrieve appropriate words from their mental lexicon. They can quickly recognize and recall the correct spellings of words, which enhances their ability to choose appropriate vocabulary and express their thoughts accurately.
- **Grammar and Syntax:** Orthographic processing also contributes to the understanding and application of grammar and syntax rules. As individuals develop their orthographic skills, they become more adept at recognizing and using correct grammatical structures and punctuation marks. This knowledge helps them construct coherent sentences and convey their ideas effectively in writing.
- **Editing and Revising:** Orthographic processing skills are essential during the editing and revising stages of the writing process. Individuals with well-developed orthographic processing abilities can identify and correct spelling errors, punctuation mistakes, and grammatical inconsistencies in their written work. They can also apply spelling and grammar rules to ensure clarity and coherence in their expression.



# Processing Speed

**Processing Speed** is the ability to automatically and fluently perform relatively easy or over-learned cognitive tasks, especially when high mental efficiency (i.e., attention and focused concentration) is required.

## How is processing speed connected to dysgraphia?

- **Writing Speed:** Individuals with slower processing speed may exhibit slower writing speed compared to their peers. Difficulties with fine motor skills, coordination, and visual-motor integration can contribute to slower handwriting or typing speed. This reduced processing speed can make it challenging for individuals to keep pace with their thoughts and complete written assignments within allotted time frames.

## How is processing speed connected to written expression?

- **Mental Processing Speed:** A deficit in this area can affect the speed at which individuals mentally process and organize their ideas before translating them into written form. Difficulties with word retrieval, sentence formulation, and organizing thoughts coherently can slow down the overall writing process. Individuals may require more time to plan, generate ideas, and structure their compositions, which can impact their ability to produce written work efficiently.
- **Editing and Revising Speed:** A deficit in this area can also impact the speed at which individuals can effectively edit and revise their written work. Individuals with slower processing speed may take longer to identify and correct spelling errors, grammar mistakes, or structural inconsistencies during the editing process. This can result in a slower and more time-consuming revision process compared to their peers.



# Visual Processing

**Visual processing** is an individual's ability to think about visual patterns and visual stimuli (e.g., What is the shortest route from your house to school?). This type of cognitive processing ability also involves the ability to generate, perceive, analyze, synthesize, manipulate, and transform visual patterns and stimuli (e.g., Draw a picture of how this shape would look if I turned it upside-down). Additionally, examples of this type of ability include putting puzzles together, completing a maze, and interpreting graphs or charts.

## How is visual processing connected to dysgraphia?

- **Letter and Word Recognition:** Individuals with weak visual processing may experience difficulties in accurately perceiving and distinguishing individual letters and words due to visual processing challenges. This can lead to difficulties in accurately reproducing the correct forms and shapes of letters, resulting in illegible or distorted handwriting.
- **Spatial Awareness and Organization:** Visual processing difficulties can affect a person's spatial awareness and organization when writing. Individuals with weak visual processing may struggle with proper spacing between letters, words, and sentences, resulting in cramped or irregularly spaced writing. They may also have difficulty aligning their writing on the page, leading to skewed or unevenly positioned text.
- **Hand-Eye Coordination:** Visual processing challenges can impact hand-eye coordination, making it difficult to accurately guide hand movements while writing. This can result in uneven letter sizing, inconsistent letter slant, or difficulty maintaining a consistent baseline.
- **Editing and Proofreading:** Visual processing skills are important during the editing and proofreading stages of the writing process. Individuals need to visually scan their written work for errors, inconsistencies, and typographical mistakes. Strong visual processing abilities help individuals detect spelling errors, punctuation errors, and formatting issues, leading to more accurate and polished written expression.

## How is visual processing connected to written expression?

- Visual processing skills are important for creating mental images, visualizing ideas, and incorporating imagery into written expression. When individuals engage in descriptive writing or storytelling, the ability to mentally visualize scenes, objects, and characters enhances their capacity to convey vivid and engaging descriptions. Visual processing facilitates the integration of sensory information and the translation of visual mental imagery into written words.



# Fluid Reasoning

**Fluid reasoning** involves the ability to use inductive and deductive reasoning to ascertain commonalities and differences, form concepts, generate rules, and apply rules to solve novel problems.

Fluid reasoning is not directly connected to dysgraphia, however, it does impact written expression in the following ways:

- **Generating Ideas:** Fluid reasoning skills are essential for generating creative and original ideas during the writing process. Individuals with strong fluid reasoning abilities can think flexibly, make connections, and generate diverse and unique concepts. This enables them to produce more engaging and innovative written content.
- **Problem-Solving:** Written expression often involves problem-solving, such as determining the best way to structure an argument or finding alternative ways to convey a complex idea. Fluid reasoning skills help individuals analyze the task at hand, consider different perspectives, and devise effective solutions. This enhances their ability to tackle writing challenges and produce well-structured and persuasive compositions.
- **Logical Organization:** Fluid reasoning contributes to the logical organization of ideas in written expression. Individuals with strong fluid reasoning abilities can identify logical relationships between concepts, sequence information in a coherent manner, and present arguments in a logical and systematic fashion. This enhances the clarity and coherence of their written work.
- **Critical Thinking:** Fluid reasoning plays a significant role in critical thinking, which is essential for effective written expression. It involves evaluating information, analyzing arguments, and drawing logical conclusions. Individuals with strong fluid reasoning skills can critically evaluate evidence, consider multiple viewpoints, and construct well-reasoned and well-supported arguments in their writing.
- **Revision and Editing:** Fluid reasoning is valuable during the revision and editing stages of the writing process. It enables individuals to analyze their own writing objectively, identify weaknesses, and suggest improvements. Strong fluid reasoning skills contribute to effective self-editing, allowing individuals to make logical revisions, improve clarity, and enhance the overall quality of their written work.



# Crystallized Intelligence/Verbal Comprehension

**Crystallized intelligence** is the breadth and depth of a person's acquired knowledge of a culture and the effective application of this knowledge. It includes general language development or the understanding of words, sentences, and paragraphs (not requiring reading) in spoken native language, the extent of vocabulary that can be understood in terms of correct word meanings, the ability to listen to and comprehend oral communication, the range of general concepts, and the range of cultural knowledge (e.g., music, art).

**How is crystallized intelligence connected to dysgraphia?** Crystallized intelligence is not directly connected to dysgraphia but does impact written expression.

**How is crystallized intelligence connected to written expression?**

- **Vocabulary and Language Skills:** Crystallized intelligence contributes to the development of a rich vocabulary and language skills. The more words and phrases a person has at their disposal, the better equipped they are to convey their ideas in writing.
- **Communication Skills:** Crystallized intelligence contributes to effective communication, both verbally and in writing. It helps individuals express their thoughts clearly, organize ideas coherently, and convey their message in a way that is easily understood by others.
- **Depth of Understanding:** Crystallized intelligence reflects a person's depth of understanding in specific areas. When writing about a particular subject, individuals with higher levels of crystallized intelligence can draw upon their extensive knowledge and insights, leading to more sophisticated and nuanced written expression.



# Long-Term Retrieval

**Long-term retrieval** refers to an individual's ability to take and store a variety of information (e.g., ideas, names, concepts) in one's mind, and then later retrieve it quickly and easily at a later time using association. This ability does not represent what is stored in long-term memory. Rather, it represents the process of storing and retrieving information.

## How is long-term retrieval connected to dysgraphia?

- **Spelling and Orthographic Retrieval:** Dysgraphia can affect the retrieval of correct spelling patterns and orthographic information. Individuals may have difficulty accessing and applying the appropriate spelling rules, resulting in frequent spelling errors or inconsistent spelling within their written work. They may struggle to retrieve the correct sequence of letters or letter combinations, leading to difficulties in accurately representing words in writing.

## How is long-term retrieval connected to written expression?

- **Word Retrieval:** Individuals with weak long-term memory may struggle to retrieve and recall words from their mental lexicon. They may have difficulty accessing the appropriate vocabulary and may experience delays or difficulties in finding the right words to express their thoughts in writing. This can result in a limited word choice and affect the overall fluency and richness of their written expression.
- **Grammar and Sentence Structure:** Retrieval difficulties can extend to grammar and sentence structure. Individuals with weak long-term memory may struggle to retrieve and apply grammatical rules, resulting in errors in sentence formation, verb tense, subject-verb agreement, or word order. They may have difficulty recalling and integrating appropriate grammatical structures, leading to challenges in conveying their ideas clearly and coherently.
- **Content Organization:** Weak long-term memory can affect the retrieval of information required for organizing and structuring written compositions. Individuals may have difficulty recalling and sequencing ideas, supporting details, or logical connections between paragraphs or sentences. This can lead to challenges in organizing their thoughts in a coherent and cohesive manner, resulting in disjointed or poorly structured written work.
- **Retrieval of Writing Strategies:** Weak long-term memory can impact the retrieval of effective writing strategies and techniques. Individuals may have difficulty accessing and applying strategies for planning, organizing, revising, and editing their written work. They may struggle to retrieve and implement effective strategies for generating ideas, constructing paragraphs, or improving the clarity and coherence of their writing.



# Executive Functioning and Attention

- **Planning and Organization:** Executive functioning skills, such as planning and organization, are essential for effective written expression. Before writing, individuals need to plan and organize their thoughts, ideas, and the structure of their composition. They must decide on the main points, supporting details, and the overall flow of their writing. Strong executive functioning skills allow individuals to create an outline or a mental framework, which helps them generate coherent and well-organized written pieces.
- **Initiation and Task Initiation:** Writing often requires individuals to start a task and sustain their effort over time. Executive functioning skills, particularly task initiation, play a role in overcoming procrastination and getting started on the writing process. Individuals with well-developed executive functioning can initiate the writing task, set goals, and begin working on their ideas promptly.
- **Attention and Focus:** Written expression demands sustained attention and focus. Individuals need to concentrate on their writing, stay on topic, and avoid distractions. Executive functioning skills, such as attention regulation, help individuals maintain focus on the writing task, resist distractions, and allocate their mental resources effectively.
- **Self-Monitoring and Self-Regulation:** Executive functioning skills contribute to self-monitoring and self-regulation during the writing process. Individuals need to monitor their progress, evaluate the quality of their writing, and make necessary adjustments. Effective self-regulation helps individuals identify errors, revise their work, and maintain the overall coherence and logical flow of their composition.
- **Inhibition and Impulse Control:** Writing requires individuals to inhibit irrelevant or impulsive thoughts, ideas, or actions that may interfere with the writing task. Executive functioning skills related to inhibition and impulse control help individuals filter out distractions, resist the temptation to deviate from the topic, and stay focused on their writing goals.





## Putting it all Together

Does the data show the characteristics of dysgraphia/SLD in written expression?

Do these difficulties (typically) result from a deficit in graphomotor function (hand movements used for writing) and/or storing and retrieving letter forms?

Are these difficulties unexpected for the student's age in relation to the student's other abilities and the provision of effective classroom instruction?

\*It is important to note that a student may not meet criteria for SLD in written expression but still have dysgraphia by demonstrating characteristics of dysgraphia and vice versa.



# Moving Forward

Most students identified with a learning disability in written expression benefit from classroom accommodations which can be obtained under Section 504 or Special Education. Some accommodations to consider include:

- Break lengthy written assignments into several sections to avoid overwhelm
- Allow access to a variety of graphic organizers to use with written assignments
- Allow the student to use voice to text software to help get ideas from head to page and then allow them time to organize the information
- Allow the student an opportunity to make corrections after a final review by teacher on all final drafts

When Dysgraphia is present:

- The use of the computer for longer writing assignments, specific work on keyboarding skills
- For youngers students, cursive writing can sometimes be an option if taught in class
- Avoid chastising the student for sloppy, careless work
- Provide notes or outlines to reduce the amount of writing required
- Reduce copying aspects of work (pre-printed math problems)

Some students with dysgraphia may benefit from an evaluation by an Occupational Therapist to determine if therapy can help to strengthen weaker muscles and improve grip strength and control.